HYDROCARBON COMBUSTION IN A FLUIDISED BED

by

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ERRATA

PAGE NO.	LOCATION-LINE NUMBER FROM TOP OF PAGE	ERROR IN	CORRECT
8	19	Humphery Devy	Humphrey Davey
12	6	Kumar	Kummer
14	24	Shtern (38)	Shtern(37)
37	7	Strokes	~~Stkxx~~ Stokes
38	13 and 16	Performated	Perforated
40	21	Explined	Explained
50	21	Lenenspiel	Levenspiel
51	2 and 5	Lenenspiel	Levenspiel
52	18	Lenfenspiel	Levenspiel
53	2	Lenenspeel's	Levenspiel's
	14	Munchi	Muchi
57	4	Infinetly	Infinitly
	19	Demostrated	Demonstrated
58	5	~~Re~~ Plemum	Plenum
86	14	Model IV	Model III
122	5	Houmand	Hovmand
129	4	d_p=9.0185	d_p=0.0185

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ABSTRACT

The advantages of flameless combustion of premixed air and fuel in presence of solids, preferably when the solids are in a fluidised state are discussed. Literature survey on flameless combustion in presence of solids indicated that combustion proceeds by heterogeneous surface reaction (if the particles are catalytic) and/or by homogeneous reaction in the free space. In the present study, premixed air-LPG combustion in presence of solids with and without catalytic effect is studied.

Premixed air-LPG combustion kinetics below ignition temperature and in presence of pure copper oxide catalyst were determined experimentally. Above the ignition temperature, the reaction rate in the free space has been assumed to be controlled by the cracking step, and cracking kinetics reported by Davis and Farrell [59] have been employed for reactor modelling.

An experimental fluidised bed reactor for high temperature (up to 1273K) studies was designed, fabricated and assembled. Premixed air-LPG combustion studies were carried out at various flow rates and temperatures. The fluidised particles used were with and without catalytic properties. Depending on the temperature and the nature of the particles, the combustion reaction could be purely heterogeneous, purely

homogeneous or both simultaneously. Catalyst particles of two different densities were also used.

The pertinent characteristics of the fluidised bed reactor were reviewed along with the available fluidised bed reactor models. Comparison of observed conversions with the conversions based on simple two phase model was found to be unsatisfactory. Adopting the bubble assemblage model approach of Wen and coworkers for heterogeneous reactions, a bubbling bed model was developed to account for both heterogeneous and homogeneous reactions and the estimated bed non-isothermality in the axial direction. This model was shown to predict the complete range of experimentally observed conversions in the fluidised bed.

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